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REMARKS

By the foregoing amendments claims 24, 42, 48, and 70 have been amended. Claims 24-51, 70, 71, 73 and 78-96 remain pending in the application.

Rejections Under § 102

In the Office Action, Claims 24, 26-38, 42-48, 50-51, and 88-91 were rejected under 35 U.S.C. § 102(e) as being anticipated by Papadopoulos (U.S. Patent No. 5,594,720). Applicants reserve the right to challenge whether this reference is available as prior art under § 102. Though the foregoing remarks are primarily directed to the independent claims, they apply with equal force to each of the claims which depend therefrom.

Amended Claim 24 is directed to a method for adaptively duplexing transmissions in a communication link which predicts uplink bandwidth requirements "using associated and respective uplink and downlink bandwidth utilization parameters which are determined by monitoring bandwidth usage in the communication link over a time period." The uplink and downlink bandwidth requirements are then used to set the uplink/downlink ratio. Claim 42 includes similar limitations. Papadopoulos does not teach or suggest such a method.

The duplexing method taught by Papadopoulos allocates uplink and downlink bandwidth based upon instantaneous bandwidth requirements as determined by the base station whenever users request access to the communication link. In accordance with the system described by Papadopoulos (and described in more detail in U.S. Patent No. 05/420,851 incorporated by reference therein), the number of slots allocated to the uplink and the downlink varies from frame to frame; however, the total number of speech slots S remains fixed for every frame. When there are relatively few users in the system, and the total number of time slots in any one direction (i.e., uplink or downlink) is less than $S/2$, the allocation of speech slots corresponds to standard TGD techniques with the S slots equally partitioned for uplink and downlink access. When the number of users increases and the number of required speech slots in either the uplink or downlink exceeds $S/2$, the uplink and downlink slot assignments are varied in an attempt to meet the demand. If more than $S/2$ time slots are required in both directions, only $S/2$ users are served in each direction, and the remaining users are dropped. Therefore, the base station determines whether to service a user request (by allocating an uplink or downlink time slot to the user) based upon the number of users and the number of time slots available (i.e., the bandwidth

requirements of the communication link) at the time the user requests service. Thus, the uplink/downlink bandwidth allocation performed by the base station is determined on a burst-by-burst basis. There is no teaching or suggestion in Papadopoulos to set the uplink/downlink bandwidth requirement ratio based upon a prediction of the uplink and downlink bandwidth requirements which have been determined by monitoring bandwidth usage in the communication link over a time period.

In contrast to Applicant's claimed method, rather than predicting uplink and downlink bandwidth requirements by monitoring bandwidth usage in the communication link over a time period, the technique described by Papadopoulos determines bandwidth requirements using instantaneous measurements of bandwidth utilization. The bandwidth allocations are performed by Papadopoulos on a per-user, per-time slot, per-voice circuit basis. See for example Papadopoulos, Column 5, Line 60 – Column 6, Line 13. Papadopoulos does not monitor bandwidth usage over a time period for use in setting the uplink/downlink bandwidth requirement ratio as set forth in Claim 24. Rather, the system described by Papadopoulos simply allocates available uplink and downlink bandwidth until there are no more slots available.

Therefore, Applicant respectfully submits that Papadopoulos does not teach or suggest Applicant's invention as set forth in Amended Claims 24 and 42.

With regard to Claims 48 and 88, those claims are directed to methods for duplexing transmissions wherein the uplink and downlink bandwidth requirements are predicted in accordance with the type of service selected for the transmission. The predicted uplink/downlink requirements are then used to establish the uplink/downlink bandwidth ratio. For example, as described in Paragraph 18 of the Application, the method can be used in a system which offers various types of services, including broadband data communication, video conferencing and telephone services. Each of those types of services have very different bandwidth requirements within a session. The methods of Claim 48 and 88 uses the information about the type of service sessions to establish the uplink/downlink bandwidth requirement ratio. Papadopoulos has no teaching or suggestion of such a method.

For example, Claim 48 includes "predicting uplink and downlink bandwidth requirements in accordance with associated and respective type of service session bandwidth parameters to establish an uplink/downlink bandwidth requirement ratio." Papadopoulos does not appear to have any teaching or suggestion of using the type of service session bandwidth

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parameters to establish the uplink/downlink bandwidth requirement ratio. Papadopoulos appears to only take into account users' requests for slots and interference from adjoining cells. Papadopoulos does not take into account the types of service session bandwidth parameters.

Similarly, Claim 88 includes predicting an uplink bandwidth requirement associated with the service type selected for the uplink and predicting a downlink bandwidth requirement associated with a selected service type being used on the downlink. The uplink/downlink bandwidth requirement ratio for a frame is based upon those two bandwidth requirements. Nowhere does Papadopoulos teach or suggest predicting bandwidth requirements associated with a type of service. Further, nowhere does Papadopoulos teach taking those bandwidth requirements which were associated with a type of service and using them to calculate an uplink/downlink bandwidth requirement ratio for a frame.

In the Office Action, Claims 70-71 and 73 were rejected under 35 U.S.C. § 102(e) as being anticipated by Raith (U.S. Patent No. 05/729,531). Applicant respectfully submits that those claims are patentable over the referenced of record.

Amended Claim 70 sets the uplink/downlink ratio of a frame based upon an initial set of bandwidth utilization parameters with which the base station was initialized. Bandwidth usage is then monitored over a period of time. The initial set of bandwidth utilization parameters is then updated based upon the monitoring. The uplink/downlink ratio of a subsequent frame is then set based upon the updated bandwidth utilization parameters. Raith does not teach or suggest such a method.

Raith is generally directed to a mobile telephone system which uses one allocation method to approximately evenly distribute mobile stations on the available channels. After a mobile station becomes active on the system, a second allocation method is used to balance the load. Raith does not suggest or describe setting the uplink/downlink ratio of a frame based upon the initial set of bandwidth utilization parameters which were used to initialize a base station. In fact, Raith does not even appear to describe any mechanism for setting an uplink/downlink ratio of a frame. In addition, neither Raith nor Papadopoulos describe monitoring the use of the bandwidth over time and then using that information to set the uplink/downlink ratio of a subsequent frame.

Similarly, Claim 73 describes a method which calculates an initial uplink/downlink bandwidth requirement ratio for a frame based upon an initial uplink and an initial downlink

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bandwidth requirement of the link. The method further determines actual uplink bandwidth requirements and downlink bandwidth requirements based on the transmission during the initial uplink and downlink time slots. An actual uplink/downlink bandwidth requirement ratio is then calculated based upon the actual bandwidth requirements. As was noted above, Raith does not teach or suggest such a method for calculating first, an initial uplink/downlink bandwidth requirement ratio and second, a subsequent uplink/downlink bandwidth ratio based upon actual bandwidth requirements.

Rejections Under § 103

In the Office Action, Claims 25, 39-41, 49, 92-96 were rejected under 35 U.S.C. § 103 as being unpatentable over Papadopoulos in view of Raith. With regard to Claims 25, 39-41 and 49, Applicant respectfully submits that those claims are patentable over the references of record in view of the discussion above regarding the claims from which they depend.

With regard to Claims 92-96, Applicant submits that those claims are patentable over the references for the following reasons. Independent Claim 92 describes a method which calculates an initial uplink/downlink bandwidth requirement ratio for a frame based upon the initial uplink and downlink bandwidth requirements of the link. Those initial uplink and downlink requirements are based on the selected quality of service. Neither Papadopoulos nor Raith describe determining an uplink/downlink ratio that in any way is related to quality of service. Further, neither Papadopoulos nor Raith describe determining an actual uplink bandwidth requirement and an actual downlink bandwidth requirement based on the bandwidth utilization during the initial uplink and downlink time slots. Raith merely has two modes of operation. A first mode is when a cell phone is registered with a network but is not active. The second mode is when the cell phone is active. Raith does not determine bandwidth requirements based upon actual bandwidth utilization. Instead, Raith merely determines whether a cell phone is registered or registered and active. Similarly, Papadopoulos also does not determine an actual uplink bandwidth requirement based on usage in an initial uplink. Rather, Papadopoulos receives slot requests from cell phones and responds to them. Papadopoulos does not look at how much bandwidth was utilized and then use that information to determine an uplink/downlink ratio. Because Claims 93-96 depend from Claim 92, the foregoing applies with equal force to each of those claims.

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Conclusion

The Applicants have endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, amendments to the claims, the reasons therefor, and arguments in support of the patentability of the pending claim set are presented above. Any claim amendments which are not specifically discussed in the above remarks are made in order to improve the clarity of claim language, to correct grammatical mistakes or ambiguities, and to otherwise improve the capacity of the claims to particularly and distinctly point out the invention to those of skill in the art. In light of the above amendments and remarks, reconsideration and withdrawal of the outstanding rejections is specifically requested. If the Examiner finds any remaining impediment to the prompt allowance of these claims that could be clarified with a telephone conference, the Examiner is respectfully requested to initiate the same with the undersigned.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 50-2075.

Respectfully submitted,

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Dated: 10/1/04

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